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(54) Title: <u>IMPROVEMENTS IN, OR RELATING TO SYNCHRONISATION</u>		
<p style="text-align: center;">CP FRAME CP FRAME CP</p> <p style="text-align: center;">SIGNALLING INTERVAL SIGNALLING INTERVAL</p> <p style="text-align: center;">CP = CYCLIC PREFIX</p>		
(57) Abstract <p>With OFDM systems the frequency domain data is the Fourier transform of the received time domain OFDM frames. The time domain frames must be sampled, at the receiver, in synchronism with the transmitter, so that each received frame contains data from only a single transmitted frame. It is vital for this synchronism to be maintained in order to maintain the orthogonality of the frames. A typical multi-carrier system, of the OFDM type, which uses a cyclic prefix permits orthogonality to be maintained when there is a small deviation from exact frame synchronisation. Because the signalling interval includes both an entire frame and the cyclic prefix, which is a repetition of part of the frame, a frame sampled within the signalling interval will contain data from only one frame. Since the signalling interval is greater than the frame period, this gives some leeway in frame alignment. In a multi-carrier system of the OFDM type, an adaptive channel equalizer, operating in the frequency domain, is often used. The internal parameters in such an equalizer contain, in addition to information about the characteristics of the channel, information which can be interpreted as the time deviation between the sampling clocks of the transmitter and the receiver. The present invention utilizes this information to control the sampling clock of the receiver in a more robust way than has previously been possible with known techniques. The present invention is particularly suitable for use in ADSL and VDSL modems which can be used to give broadband access over copper networks. The invention is also of relevance to broadband transmission in mobile and semi-mobile systems for transmission over the radio channels.</p>		